Paysonia, a New Genus Segregated from *Lesquerella* (Brassicaceae)

Steve L. O'Kane, Jr.
Department of Biology, University of Northern Iowa, Cedar Falls, Iowa 50614-0421, U.S.A.
steve.okane@uni.edu

Ihsan A. Al-Shehbaz
Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166-0299, U.S.A.
ihsan.al-shehbaz@mobot.org

ABSTRACT. The annual, auriculate-leaved species of *Lesquerella* (Brassicaceae) of the southeastern United States are transferred to the new genus *Paysonia.* The new combinations *Paysonia auriculata, P. densipila, P. grandiflora, P. lasiocarpa, P. lasiocarpa* subsp. *berlandieri, P. lasiocarpa* subsp. *heterochroma, P. lescurii, P. lyrata, P. perforata,* and *P. stonensis* are proposed. The distinguishing characters between the combined taxon *Lesquerella–Physaria* are discussed. A detailed description of the genus and a key to the species are provided.

Key words: Brassicaceae, *Lesquerella, Physaria, Paysonia,* Southeastern United States.

In his account of the auriculate-leaved species of the genus *Lesquerella* S. Watson, Rollins (1955: 241) stated that these species "are all more closely related to each other than to other species of the genus and should be formed into a separate section or subgenus." Based on leaf and trichome morphology, chromosome number, duration, and molecular data (see below), we concur with Rollins's assessment of the close relationship among these species and that they warrant taxonomic recognition. No formal taxonomic recognition of this well-marked group of species, however, has been proposed. Rollins and Shaw (1973) included them in their informal "Group 10" (of 10 groups of *Lesquerella* species), but in his monograph of the North American Brassicaceae, Rollins (1993) made no such distinction.

Rollins (1955: 241) wondered where had the auriculate-leaved "Lesquerellas come from and by what migratory route did they get here." By "here" he was referring to their geographic range in the southeastern United States west to Texas and Oklahoma. Rollins's question presupposed that the auriculate-leaved species *were* Lesquerellas, and that they dispersed to the southeastern United States from their main distribution in the American West. The group containing the auriculate-leaved species (hereafter *Paysonia*) also contain species of the genera *Dimorphocarpa* Rollins, *Dithyrea* Harvey, *Lyrocarpa* Hooker & Harvey, *Nerisyrenia* Greene, and *Synthlipsis* A. Gray. These five genera, together with *Paysonia, Lesquerella,* and *Physaria,* form a monophyletic group easily distinguished from the rest of Brassicaceae by having pollen grains with 4–10 colpi. By contrast, the remaining ca. 96% of the family have tricolpate pollen.

In a companion paper (Al-Shehbaz & O'Kane, 2002 this issue) we combine *Lesquerella* and *Physaria* (Nuttall ex Torrey & A. Gray) A. Gray into a much-expanded *Physaria.* In that paper we provide a justification for these nomenclatural innovations and supporting literature. The larger, monophyletic *Physaria* is characterized by (1) stem leaves that are cuneate or attenuate into a petiole-like base, (2) chromosome numbers based on $n = 4, 5, 6$, or 7 (with a few polyploids derived from these numbers; see Rollins & Shaw, 1973), (3) perennial duration (or biennial or rarely annual, through derivation from perennial ancestors), (4) no documented interspecific hybridization (Rollins & Shaw, 1973), and (5) trichomes that are strictly stellate to stellate-peltate (often webbed between the rays), and nearly always tuberculate. We here place those species excluded from the expanded *Physaria* in a new genus, *Paysonia,* named in honor of Edwin B. Payson (1893–1927), the first monographer of *Lesquerella* (Payson, 1922). *Paysonia* is characterized by (1) stem leaves that are sessile and auriculate, (2) chromosome numbers based on $n = 8$, (3) an annual duration, (4) frequent natural (and artificial) interspecific hybridization (Rollins, 1957; Rollins & Shaw, 1973; Rollins & Solbrig, 1973), and (5) trichomes that lack tubercles and are not stellate but rather are simple, one-branched, bifurcate, or dendritic (Rollins & Banerjee, 1975, 1979).

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Molecular data (O'Kane, unpublished) based on DNA sequences of the nuclear ribosomal internal transcribed spacer (ITS) support the recognition of *Paysonia* and show that this genus and the combined taxon *Physaria–Lesquerella* shares a common ancestor.

Paysonia O'Kane & Al-Shehbaz, gen. nov. TYPE: *Paysonia lescurii* (A. Gray) O'Kane & Al-Shehbaz.

Herba annua; pili ramosi minute stipitati et pilis simpilicibus praesentibus. Folia caulina sessilia, sagittata vel auriculata. Racemi ebracteati, valde elongati. Sepala oblonga, nonsaccata. Petala alba vel flava, obovata. Ovula 2–8(–10) per locula. Siliculis globosis, subpyriformis, suborbiculatis, vel subovatis, teretis vel compressis et angusti- vel latiseptatis; septum completum vel perforatum; stylus 1–3 mm longus; stigma integra. Semina compressa; cotyledones accumbentes.

Herbs annual. Trichomes coarse, simple, mixed with much smaller, short-stalked, forked or subdendritic ones. Stems erect to ascending, sometimes decumbent. Basal leaves petiolate, rosulate, lyrate or pinnately lobed. Cauline leaves sessile, minutely to coarsely auriculate or sagittate, often amplexicaul, dentate. Racemes many flowered, ebracteate, often elongated considerably in fruit; rachis straight. Fruiting pedicels slender, ascending to divaricate or recurved, straight or slightly curved. Sepals oblong, deciduous, suberect, ascending, or spreading, equal, base of inner pair not saccate, margin membranous. Petals yellow or white, broadly obovate, apex rounded; claw slightly differentiated from blade. Stamens 6, erect, tetradynamous; filaments dilated or not at base; anthers oblong, not apiculate at apex. Nectar glands confluent, subtending bases of median stamens, surrounding those of lateral stamens. Ovules 2 to 8(to 10) per locule. Fruit dehiscent silicles, globose, subpyriform, suborbicular, or subovate, terete, latiseptate or angustiseptate, not inflated, subsessile; valves papery or leathery, veinless, glabrous or pubescent with branched and/or simple trichomes; septum complete, perforated, or reduced to a rim, membranous; style 1–3 mm long, slender, glabrous or pubescent; stigma capitate, entire. Seeds subbiseriate, margined, orbicular to subovate, flattened; cotyledons accumbent.

KEY TO THE SPECIES OF *PAYSONIA*

1a. Fruits orbicular or elliptic, flattened; valves often with coarse simple trichomes and much smaller branched ones.
  2a. Fruit latiseptate; fruiting pedicels divaricate-ascending; cauline leaves strongly auriculate to sagittate, amplexicaul; filaments dilated at base . . . . *P. lescurii*
  2b. Fruits angustiseptate; fruiting pedicels recurved; cauline leaves minutely auriculate, not amplexicaul; filaments not dilated at base . . . . *P. lasiocarpa*
1b. Fruits globose to subpyriform, not flattened; valves uniformly with small, simple and/or branched trichomes.
  3a. Flowers white; septum perforated.
    4a. Fruits subpyriform, valves glabrous or sparsely pubescent outside, densely pubescent inside; styles glabrous . . . . *P. perforata*
    4b. Fruits subglobose, valves densely pubescent outside, glabrous inside; style pubescent . . . . *P. stonensis*
  3b. Flowers yellow; septum complete.
    5a. Fruit valves and styles pubescent . . . . *P. densipila*
    5b. Fruits valves and styles glabrous.
      6a. Fruits 2.4–3.5 mm long; ovules 2–4 per locule; septum opaque . . . . *P. lyrata*
      6b. Fruits 4–6(–8) mm long; ovules (4–)6–8(–10) per ovary; septum translucent.
        7a. Lower stems hirsute with spreading simple trichomes; petals 4–5 mm wide; fruiting raceme congested, slightly elongated . . . . *P. auriculata*
        7b. Lower stems pubescent with branched trichomes; petals 6–10 mm wide; fruiting raceme lax, considerably elongated . . . . *P. grandiflora*

For a complete synonymy of the following taxa, see Rollins (1993).

Paysonia auriculata (Engelmann & A. Gray) O'Kane & Al-Shehbaz, comb. nov. Basionym: *Vesicaria auriculata* Engelmann & A. Gray, Bost. J. Nat. Hist. 5: 240. 1845. *Lesquerella auriculata* (Engelmann & A. Gray) S. Watson, Proc. Amer. Acad. Arts 23: 250. 1888. TYPE: U.S.A. Texas: Austin Co., near San Felipe, *F. Lindheimer 217* (holotype, GH; isotypes, GH, MO).

Paysonia densipila (Rollins) O'Kane & Al-Shehbaz, comb. nov. Basionym: *Lesquerella densipila* Rollins, Rhodora 54: 186. 1952. TYPE: U.S.A. Tennessee: Marshall Co., Duck River bottom, N of Verona, 10 Apr. 1949, *A. J. Sharp, C. J. Felix & W. Adams 11187* (holotype, GH; isotypes, GH, MO, NY).

Paysonia grandiflora (Hooker) O'Kane & Al-Shehbaz, comb. nov. Basionym: *Vesicaria grandiflora* Hooker, Curtis's Bot. Mag., n.s. 10: pl. 3464. 1836. *Lesquerella grandiflora* (Hooker) S. Watson, Proc. Amer. Acad. Arts 23: 250. 1888. TYPE: U.S.A. Texas: Austin Co., San Felipe, *Drummond 20 bis* (lectotype, designated by Rollins & Shaw (1973), K; isolectotypes, GH, NY).

Paysonia lasiocarpa (Hooker ex A. Gray) O'Kane & Al-Shehbaz, comb. nov. Basionym: *Vesicaria lasiocarpa* Hooker ex A. Gray, Smithsonian Contr. Knowl. (Pl. Wright.) 5: 13. 1853. *Lesquerella lasiocarpa* (Hooker ex A. Gray) S. Watson, Proc. Amer. Acad. Arts 23: 251. 1888. TYPE: "Country and state unknown:" between Bexar and Trinity River, May 1828, *Berlandier s.n.* (holotype, K).

Paysonia lasiocarpa subsp. **berlandieri** (A. Gray) O'Kane & Al-Shehbaz, comb. et stat. nov. Basionym: *Synthlipsis berlandieri* A. Gray, in Emory, Report U.S. & Mex. Bound. Survey 34. 1859. *Lesquerella lasiocarpa* var. *berlandieri* (A. Gray) Payson, Ann. Missouri Bot. Gard. 8: 139. 1922. TYPE: Mexico. Tamaulipas: Matamoros, *Berlandier 3017* (lectotype, designated by Rollins & Shaw (1972), GH; isolectotypes, GH, US).

Paysonia lasiocarpa subsp. **heterochroma** (S. Watson) O'Kane & Al-Shehbaz, comb. et stat. nov. Basionym: *Synthlipsis heterochroma* S. Watson, Proc. Amer. Acad. Arts 17: 321. 1882. *Lesquerella lasiocarpa* var. *heterochroma* (S. Watson) Rollins, Rhodora 57: 245. 1955. TYPE: Mexico. Nuevo León: Guajuco, 27 mi. SE from Monterrey, *Edward Palmer 33* (holotype, GH).

Paysonia lescurii (A. Gray) O'Kane & Al-Shehbaz, comb. nov. Basionym: *Vesicaria lescurii* A. Gray, Manual Bot., ed. 2, 38. 1856. *Lesquerella lescurii* (A. Gray) S. Watson, Proc. Amer. Acad. Arts 23: 250. 1888. TYPE: U.S.A. Tennessee: Davidson Co., near Nashville, Apr. 1855, *Leo Lesquereux s.n.* (lectotype, designated by Rollins (1952), GH).

Paysonia lyrata (Rollins) O'Kane & Al-Shehbaz, comb. nov. Basionym: *Lesquerella lyrata* Rollins, Rhodora 57: 252. 1955. TYPE: U.S.A. Alabama: Franklin Co., near Richardson's Crossing, 7 mi. E of Russellville, 16 Apr. 1955, *Reed C. Rollins, George R. Cooley & L. J. Brass 5599* (holotype, GH; isotypes, GH, MO, NY, UC).

Paysonia perforata (Rollins) O'Kane & Al-Shehbaz, comb. nov. Basionym: *Lesquerella perforata* Rollins, Rhodora 54: 190. 1952. TYPE: U.S.A. Tennessee: Wilson Co., 5 mi. N of Lebanon, 30 Mar. 1952, *Reed C. & Diane Rollins 5207* (holotype, GH; isotypes, F, GH, MO, NY, US).

Paysonia stonensis (Rollins) O'Kane & Al-Shehbaz, comb. nov. Basionym: *Lesquerella stonensis* Rollins, Rhodora 57: 255. 1955. TYPE: U.S.A. Tennessee: Rutherford Co., E Fork of Stones River, Walterhill, 26 Apr. 1955, *Reed C. Rollins 55176* (holotype, GH; isotypes, F, GH, MO, NY, US).

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